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University of Toronto

COMPUTER SCIENCE

NEWSLETTER

No. 94

Edited by C. Alan Ford

Date November 30, 1972

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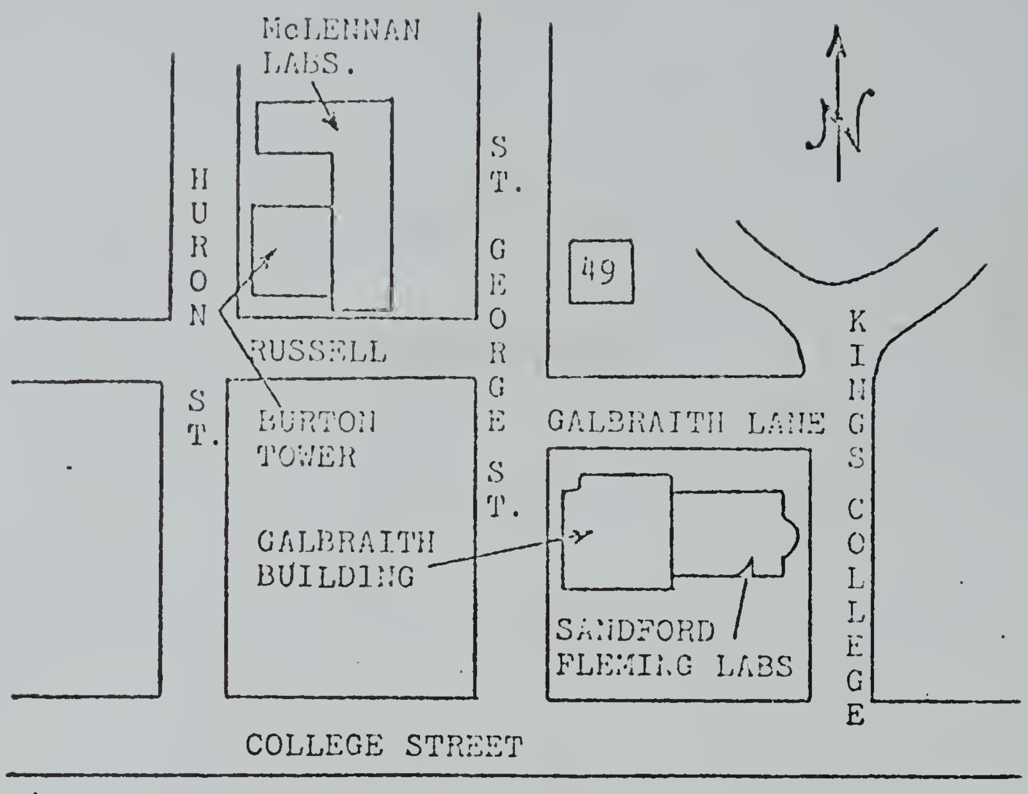
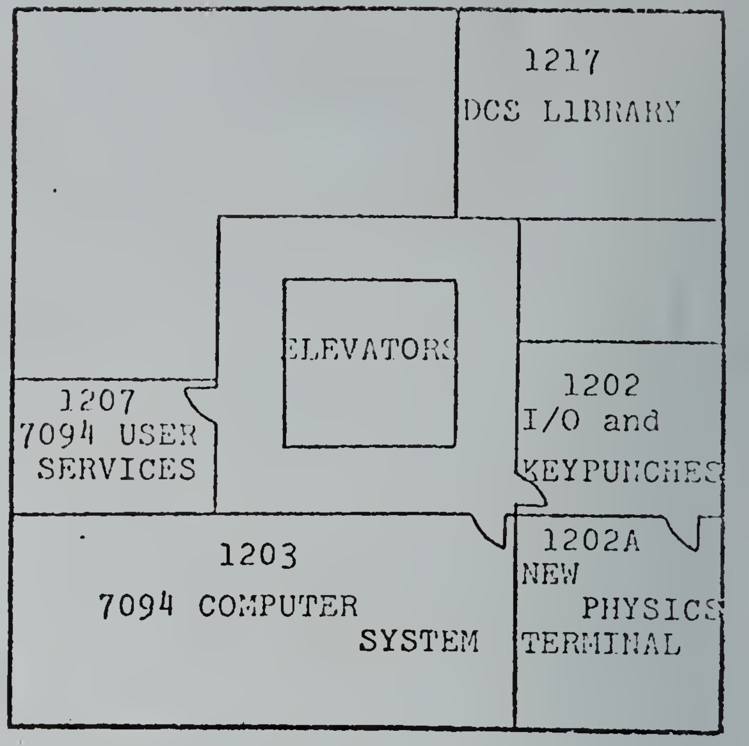
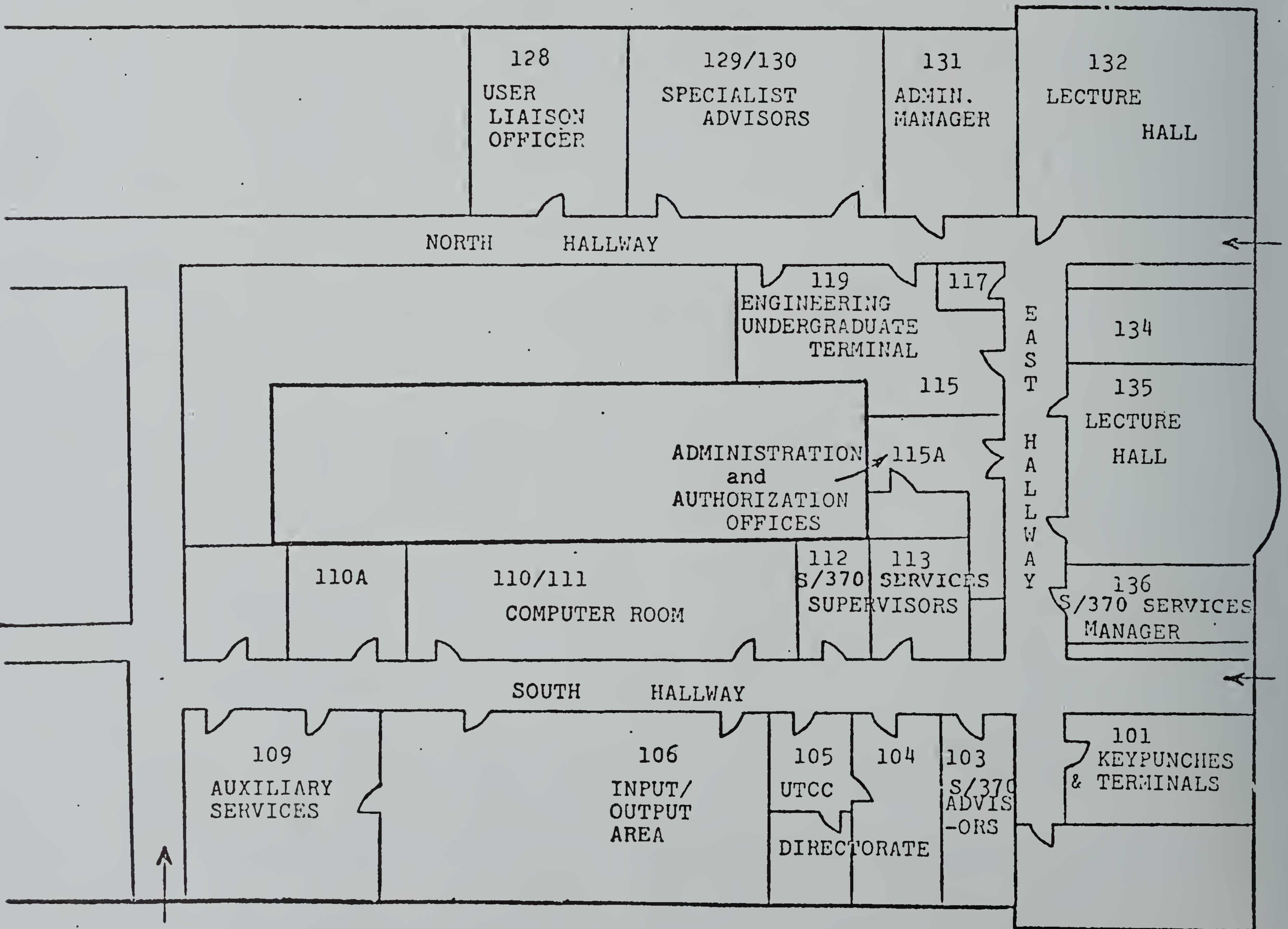




FLOOR PLAN: 12th FLOOR BURTON TOWER

FLOOR PLAN: UNIVERSITY OF TORONTO COMPUTER CENTRE
SANDFORD FLEMING LABORATORIES



COMPUTER ASSISTED LEARNING AT ERINDALE

P.P.M. Meincke

Over the past three years, Erindale College has developed an extremely flexible system for computer assisted learning, which both the writers of lesson material and students find very helpful and easy to use. This system is now available to anyone who has access to the APL (A Programming Language) system on the Interactive facility of the University of Toronto Computer Centre.

The system called APLCAT has been described in papers given at various symposia and conferences on instructional technology and computing. Many institutions throughout North America have expressed interest in acquiring the set of functions to assist in the writing of lessons as well as the existing lessons. Approximately twenty lessons are available at present, mainly in Mathematics, Physics, Electronics and Logic. Lesson materials in a wide variety of other subjects are being written and tested by a number of people throughout the University. Professor John Hurd of Trinity College has written a number of lessons to teach Greek and Professor Kurmey of the Faculty of Library Science has prepared a series on Statistics. Professor Deckers of Erindale College is working actively with some of his colleagues on lessons in Chemistry. The Faculty of Education has also been actively exploring the system. As well, some use is being made of the electronics material in the Faculty of Applied Science and Engineering.

Mr. David Vaskevitch, an undergraduate student at this University, has played a central role in developing APLCAT and has written many of the lessons including some outstanding work in symbolic logic. He has given several papers and has been invited to other Universities to discuss APLCAT. Mr. David Crouse, of Erindale College, has been working on a SHARE Committee to provide documentation standards for CAL material in APL.

The reactions of students have generally been favourable. More senior students tend to find the available material, which concentrates mainly on very basic ideas, rather limited; nevertheless, those students who are struggling with the material for the first time or are trying to review, have found them useful.

The approach at Erindale has been to use this learning technology as a complement to more conventional teaching methods. There has been no attempt to force students to take lessons on the system to compare their progress with standard methods. The basic philosophy is that people learn in different ways; it is up to them to find the way best suited to their needs.

A wide variety of teaching strategies is being explored. Some lessons are simple drill and practice or multiple choice, while others have complicated branching which give the student extra help or additional questions if his answers indicate that such help may be necessary. The first year physics students have been able to run a linear accelerator laboratory simulated in one of the lessons and see how the speed and mass of elementary particles change as the energy is varied. This simulation has been extremely successful.

The tendency now is to write lessons which are controlled by the learner as much as possible. In other words, the learner determines the kind of questions he wants to explore, the complexity of the problems and the degree of help he is given. The learner is now able to ask questions of the computer rather than the other way around. This approach is much less frustrating and can be useful to a wider range of people than the usual computer assisted "page turners".

Further information about this system can be obtained from any of the following people:

Mr. David Crouse - Erindale College, 828-5311
Mr. Ford Clancy - Erindale College, 828-5339
Mr. David Vaskevitch, 3 Carluke Cres., Willowdale, 222-6656

For details on accessing the CAL lessons and drills, please see the article "CAL Lessons" under the Interactive Systems section of this Newsletter.

CHRISTMAS HOLIDAY SCHEDULE

The Computer Centre will provide reduced services during the December/January holiday period. The non-operating offices will be closed on December 22,25,26 and January 1 in accordance with the announced university holiday schedule. Computer service will be available during the 9:00 a.m./5:00 p.m. period on December 22,23 and 24. All facilities will be closed on December 25 and January 1.

GRAFFITI AND SUGGESTION BOXES

C. A. Ford

The Computer Centre provides conveniently located suggestion boxes, graffiti sheets and a S/370 computer utility called "ISUGGEST". Through these media users may direct suggestions, complaints or ideas to the Computer Centre. These communications are greatly appreciated by the staff and management of the Centre. These media are intended, of course, to supplement but not to replace direct person-to-person contact between the users and Computer Centre staff.

The graffiti sheets are self-answering. The suggestion box and the "ISUGGEST" utility (SSB 53:72) are now answered primarily by direct person-to-person communication. As a result, we have at least temporarily dropped the question and answer feature from the Newsletter. Instead, we try to cull from all these media particularly significant items for elaboration in these pages. Newsletter #92 carried a feature about the salvage of waste paper. Read on in this issue for other items arising from graffiti action.

THE SUPPLY OF TYPEWRITER TERMINALS

C. A. Ford

The Interactive Computer System mechanized on our S/360-65 computer and the CRJE system on the S/370-165 are growing in popularity. One outcome of this is a need for more 2741 or equivalent typewriter terminals. "Why", we have been asked, "does the Computer Centre not provide enough of these devices?".

As a matter both of policy and of practicality, the Computer Centre cannot offer an unlimited supply of terminal devices to the computer users. Room 101 in Sandford Fleming is provisioned by the Computer Centre and is intended primarily as a demonstration and training room. It should not be thought of as a source of publicly available terminals. All other terminals on campus are the operational and financial responsibility of user departments. The Engineering Faculty is providing a small roomful of terminals as an interactive computing laboratory. Erindale College, Dentistry and the Faculties of Library Science and of Management Studies also provide pools of terminals in their areas.

If you have continual need for typewriter terminal time you are well advised to make arrangements for the installation of a 2741 or equivalent in your own office or laboratory. After all, part of the attraction of time-sharing systems is the ability to access the computer from any location convenient to yourself.

Requests for the provision of a 2741 terminal should be addressed to Mr. Sam Goldfarb, Manager of Interactive Systems, at 928-3787.

ALAN WICKENS, DEVELOPMENT MANAGER, DEPARTS

C. A. Ford

Mr. A.J. Wickens joined the Centre in 1968 as a system programmer. In 1970 he became the Operations Manager and, in 1971, changed over to manage the hardware and software Development Group.

Alan has now resigned from the Centre in favor of a planning and development position with the Datacrown service bureau. Datacrown gains what UTCC loses, a conscientious leader with high skills in big system technical work.

Our loss is to be buffered through assigning specifically S/370 and S/360 software work to the direction of the system managers, Dr. D. J. McNaughton and Mr. S. Goldfarb. Longer ranged and intersystem planning and development work will continue, reporting to the Assistant Director.

Au revoir, A.J.W.

HUMANITIES USERS AT UTCC

P. Leggatt

System/370 User Services is interested in meeting the needs of people in the humanities field using the facilities of the Computer Centre. This area would include, for example, techniques for text editing, concordance and index generating on small and project-oriented scales.

We would like to ask users who have been working with computers in this field to submit programs which they feel may be of use to others. We also would like to ask Humanities users to report any special activities, besides programming, that they may be engaged in at the Computer Centre. This information will be useful to Humanities users in general by increasing the choice of programs as well as contacts. Eventually, any programs collected will be set up in a software library and a publication issued to document their nature, capacity and application to literary text processing.

Users interested in responding to this article should see Mr. Stan Yagi (Room 112 Sandford Fleming Building) or phone him at 928-7331.

TORMON I

R. Cavanagh

TORMON I, the Computer Centre's new hardware monitor, was first demonstrated at SHARE XXXIX this August. This new concept in hardware monitoring was conceived, designed, and built by the UTCC hardware and measurement staff.

Hardware monitors provide means for the extraction of electrical signals from a computer system which indicate the status of all major system components (e.g. channels, CPU) as well as subsections of these components (e.g. track activity on a particular disk drive). These signals may then be logically combined (using standard logic gates AND, OR, NOT, etc.) and the results recorded on some medium for immediate or subsequent analysis. It is in this area of data retention that TORMON I departs from previous monitors.

HARDMON II, a previous monitor described in an earlier Newsletter, displayed system data in real-time using meters. It also recorded on an eight channel strip-chart. This low-complexity approach served well but statistical data reduction required laborious hand retrieval. Most commercial monitors accumulate the data signals in counter registers and periodically (e.g. every 5 seconds to 1 minute) dump the contents onto magnetic tape. At the conclusion of the measurement the tape is processed against a standard program to generate a report. The significant time lag inherent in this method adversely affects the rate at which system tuning can be accomplished. In the event of a measurement set-up error (which is quite common) a considerable waste of time and effort ensues.

TORMON I, like the commercial monitors, uses counting registers to accumulate data. But instead of dumping to tape it transmits the contents of the registers periodically to an APL PLUS file in a remote computer via a standard telephone. Using the shared file feature of APL PLUS another program extracts data from the file as it is received, processes it, and displays the results on a remote terminal (2741 or CRT). Almost immediate displays are possible and the raw data are retained in the file for further processing and report generation. The remote terminal used for measurement display is usually placed beside the monitor but may be located almost anywhere. At SHARE we displayed real-time measurements from the S/370-165 on a 2741 terminal at the Royal York Hotel!

But the development of TORMON I is only one part of a long-term project at UTCC to develop all phases of the art of hardware monitoring. At present our main thrust is toward new techniques for using hardware monitors which are not only applicable to TORMON I but to most other monitoring systems. These new procedures are regularly being applied to the S/370-165 system.

This project has many benefits for the users. The monitor has enabled a substantial improvement in system throughput, resulting in faster turnaround. System resources can be accurately measured and new equipment acquired only in the areas where it will have the greatest impact on throughput thus keeping computing costs as low as possible.

BITS AND BYTES: SCRAP PAPER SALVAGE

C. A. Ford

The goal: to reclaim for reprocessing as much as possible of the discarded computer card and paper stock. The Bits and Bytes Buckets have been provided to assist users to dispose of such stock and thus make it possible for the janitorial staff to keep it separate from ordinary garbage. This scheme arose in response to many suggestion box and graffiti items.

The actuality: much good material goes into trash (unmarked) buckets and much garbage goes into Bits and Bytes Buckets.

The problem: this wastes material and manpower, for your salvage efforts are lost because of the contaminating garbage. And we still care about it.

The cause: lack of your interest? ... lack of understanding of the Bits and Bytes Buckets?

The solution depends upon the cause(s). Maybe we will put the Buckets up high so that those who care will hoist reclaimable material into them but others can use easy-to-hit garbage cans.

INPUT/OUTPUT COST ABSORPTION FOR REMOTE TERMINALS

C.A. Ford

A long-standing computer policy of this university has been to charge for computer services provided to users at remote terminals at the same price as are charged locally. This leads to apparent anomalies concerning special forms supplied at remotes and the operator-intervention required for forms setup. Sometimes it is suggested that the price for output and forms setup be reduced for such work.

The answer rests upon the stated policy: prices are the same for users, remote or local The policy is justified as follows: many expenses are incurred, both at the Centre and at the terminals, which are specific to the remote I/O function. These costs have been estimated and reduced by the amount of earnings anticipated from the I/O of remote jobs. The balance is the University's subsidy to remote users. The policy quoted is consistent with the exclusion of this subsidy from consideration in setting the prices.

ACCESS TO UNIVERSITY OF WESTERN ONTARIO CDC CYBER 73

S. Yagi

We now can provide local access to the University of Western Ontario Control Data Cyber 73 computer. The machine used for such access is the Arts & Science terminal DATA 100 Model 78 located in the Sidney Smith Building (SS 2105).

Since the primary function of the DATA 100 at AST is to serve as a remote terminal to the S/370-165, jobs to be run on the CDC Cyber 73 will be scheduled by UTCC staff for submission at specified times.

Users who feel, after consultation with S/370 User Services staff, that there is an advantage in running their jobs on the CDC Cyber 73 should approach the allocations sub-committee for the subsidy required. The pro tem chairman of the sub-committee is Professor H.L. Welsh, Department of Physics.

Under a reciprocal arrangement, users at UWO are able to use our S/370-165 via a remote reader/printer terminal located on their campus.

USERBOOK-A NEW PUBLICATION

J. Campbell

A new Computer Centre publication called USERBOOK is now available. This publication is modular in structure and is composed of the five parts listed below:

SECTION 1--General
SECTION 2--Advanced General
SECTION 3--System/370-165 Services
SECTION 4--Interactive System/360-65 Services
SECTION 5--IBM 7094 Services

The USERBOOK or any of its Sections may be purchased at the Information Office, Sandford Fleming Building Room 134 (telephone 928-4990 or 928-4991). Anyone purchasing a complete Section of USERBOOK may take advantage of the updating service provided free-of-charge.

IBM REFERENCE MANUALS

W.E. Greene and R. Cox

System/370 User Services is concerned about the rate of disappearance of IBM manuals in Room 103. While IBM manuals are not irreplaceable, replacement copies are frequently out of stock in Canada and as a result may take six weeks or more to arrive. Needless to say, this inconveniences our other users.

We recognize that users must obtain IBM manuals in many instances. We can help you get these manuals. If you need such reference material, please contact the Information Office, SF 134, (telephone 928-4991). We will be happy to help you obtain the manuals you require.

PERSONNEL CHANGES

J. Schick

The Computer Centre welcomes aboard several new people this month. Barbara Malham, Bill Nevill and Edward Stubbs have joined S/370 Services as Operators. Bill Redmond, who has worked as temporary staff for the last few months, is now a full-time member of staff.

Angel Wells is new in the Administrative Group helping the accounting assistants.

A number of people are leaving the Centre this month. Jeff O'Brien, Len Daniel and Jose Luzadas have all left the S/370 Operations group.

Selby Shanly leaves our Development Group to travel in the British Isles.

Roy Finlayson is leaving to take up employment elsewhere. During his three years here, he worked as a crew chief and I/O Supervisor. We wish him all the best in his new venture.

CALL FOR PAPERS

FIFTH ANNUAL APL USERS' MEETING

MAY 15-18, 1973
TORONTO, *ONTARIO*

PAPERS ARE REQUIRED FOR THIS CONFERENCE ON THE TOPICS OF APL LANGUAGE, *APPLICATION*, *AND IMPLEMENTATION. YOU ARE INVITED TO SUBMIT BY* 1 *JANUARY* 1973, 100 *TO* 200 *WORD ABSTRACTS*, *TOGETHER WITH AUTHOR'S NAME*, *POSITION TITLE*, *AFFILIATION*, *AND BRIEF PROFESSIONAL BIOGRAPHY. COMPLETE MANUSCRIPTS ARE REQUIRED BY* 15 *FEBRUARY* 1973. *DIRECT FURTHER QUESTIONS AND SEND MATERIAL TO THE PROGRAMME CHAIRMAN*:

E.M. EDWARDS
CONTROL DATA CANADA LTD.
1855 *MINNESOTA COURT*
STREETSVILLE, *MISSISSAUGA*
ONTARIO, *CANADA*

PHONE. (416)270-1500 *EXT*. 240

ANOTHER APL CONFERENCE IS PLANNED FOR AUGUST IN COPENHAGEN. EVERY EFFORT WILL BE MADE TO CO-ORDINATE THE PROGRAMMES FOR THESE TWO CONFERENCES SO THAT THEY WILL SUPPLEMENT EACH OTHER.

FOR FURTHER INFORMATION, *CONTACT*:

MR. L.B. MOORE
COMPUTER CENTRE
RYERSON POLYTECHNICAL INSTITUTE
50 *GOULD STREET*
TORONTO, *ONTARIO*

PHONE. (416) 595-5056

DEPARTMENT OF COMPUTER SCIENCE NEWS

C. Phillips

DEPARTMENT COUNCIL

Membership

The first meeting of the Department Council was held on Tuesday, November 7. The faculty members this year are Professors Cook (Undergraduate Secretary), Corneil (Graduate Committee), Hull (Chairman), Lee (CSRG), Mylopoulos (Graduate Secretary) and Swenson (Curriculum Committee). Five graduate students were elected for this year. They are N. Horspool, A. Kittler, B. Moenck, J. Molnar, and F. Tompa. The undergraduate representatives are: J. Heifetz (4th year), H. Levesque (3rd year), M. Fox (2nd year), M. Baldwell, M. Bulger, and G. Sargant (1st year).

Curriculum Committee

Professor Swenson reported that the Curriculum Committee was recommending a few minor changes to the Computer Science specialist program. A new specialist program, Computer Science for Data Management, will be submitted to the Faculty of Arts and Science Curriculum Committee to be implemented next year. See below for more details.

Enrolment

Professor Cook reported that the undergraduate program is running smoothly. The size of the fourth year class has increased from approximately 20 last year to about 35 this year. Professor Corneil reported no increase in the graduate enrolment this year. There are about 45 Ph.D. students and 35 M.Sc. students.

Extension

Professor John Lipson has accepted a cross appointment to the Division of Extension next year. He will teach at least one course in Extension as part of his regular teaching load. The general trend at U of T appears to be away from "overtime" teaching for evening courses.

This year the department is offering a third year course, Information Structures, in the evening during the spring term. Within the very near future it is hoped that the first three years of our undergraduate program will be available to students attending classes only in the evening.

Part-time M.Sc.

Another first this year is the enrolment of three part time M.Sc. students. They are taking one or two classes and it is thought that it will take three years to complete the requirements for M.Sc. degree. The three pioneers are: Stella Cameron, John Billings and Phyllis Davison.

Announcement

Dean Greene has asked Professor T.E. Hull to continue as Department Chairman for a second term and Professor Hull has accepted.

PROPOSED SPECIALIST PROGRAM

IN COMPUTER SCIENCE FOR DATA MANAGEMENT

The Curriculum Committee with the advice and help of Professor Shanno of the Faculty of Management Studies has proposed a program recommended for undergraduate students interested in combining these two areas. If the suggested options in third and fourth year with prefix BUS are taken, advanced standing in the MBA program is possible.

- PROPOSED -

SPECIALIST PROGRAM IN COMPUTER SCIENCE FOR DATA MANAGEMENT

Recommended first-year preparation:

COM 100 Financial Accounting
CSC 148F Introduction to Computing
CSC 158S Computer Applications
ECO 100/102 Introduction to Economics
MAT 134/135/139 Calculus or Calculus with Linear Algebra

Second-year program:

COM 221F Management Accounting
COM 222S Information Systems and Control
CSC 258F Computer Organization
CSC 248S Programming Languages and Applications
CSC 228F Programming Techniques for Data Processing I
MAT 225/224F Linear Algebra, or Intermediate Linear Algebra
MAT 234/239 Advanced Calculus for Social Scientists, or Analysis

suggested option:

CSC 208S Assembly-Language Programming and Applications

Third-year program:

CSC 334F Programming Techniques for Data Processing II
CSC 344S Information System Language Design
CSC 348F/MAT 344S Introduction to Applied Algebra, or Introduction to Combinatorics
ECO 240F Mathematical Approach to Macroeconomic Theory
ECO 241S Mathematical Approach to Macroeconomic Theory
STA 232 Introduction to Statistics

suggested options:

BUS 1061X Administrative Behaviour
BUS 1062X Administrative Theory
CSC 361S/236S Numerical Analysis, or Numerical Methods

Fourth-year program:

CSC 364S	Introduction to the Theory of Computation
CSC 434F	Data Management Systems
CSC 444S	Economics of Computers

suggested options:

BUS 1030X	Business Finance
BUS 1050X	Marketing
BUS 1077X	Linear Algebra for Management Science

Remark: If MAT 134/135 is taken in first year, then MAT 225 will be required in place of MAT 224F in second year.

RECENT ACQUISITIONS IN THE DCS LIBRARY

Donovan, J. J.
Systems programming.
New York, McGraw-Hill, 1972.

Mullish, H.
Modern programming: PL/I.
Waltham, Mass., Xerox College Publ., 1971.

Oatley, Keith.
Brain mechanisms and mind.
London, Thames and Hudson, 1972.

DCS LIBRARY MISSING BOOKS LIST - OCTOBER 1972

Cadow, H.M.
OS/360 Job control language.

Computing Surveys
Vol. 4 #2.

Flores, I.
Job control language.

Flores, I.
The logic of computer arithmetic.

Ralston, A.
A first course in numerical analysis.

Ralston, A.
Mathematical methods for digital computers, v.1.

Sackman, H.
Man-computer problem solving.

Sterling, T.D.
Introduction to statistical data processing.

SYSTEM/370 SERVICES ORGANIZATION

I. Darwin and A. Jones

A person sits in front of an electric typewriter which talks back to her . . .

Another sits all day in front of a television screen watching not pictures but words. He pushes buttons and types on a keyboard in front of the screen . . .

Someone runs eighty computer programs, makes a minor change to the computing system, then proceeds to run all eighty again. Then he sits down in his office with the outputs . . .

A very large and expensive machine stops unexpectedly. A man arrives with a small round package. He feeds the contents into a refrigerator-sized tape deck, walks across the hall and pushes a few buttons. Within a few minutes the machine tells him what part of it to replace. He does so, then restarts the machine, and leaves . . .

Two people spend a whole night poring over two hundred pages of paper, making cryptic markings here and there . . .

A huge machine runs constantly in a distant room. No-one is seemingly aware of its existence . . .

A man draws a plan of a building as it isn't. Two months later, the building is as he has drawn it . . .

Behind office doors, countless meetings take place . . .

Time marches on . . .

There is a lot more involved in bringing System/370 Service to the user than most see. At UTCC the System/370 Services group is organized into several major areas of responsibility. This division of responsibility is to bring the best service and the most competent specialists to the user community.

Every user of System/370 has had some contact with the Input/Output Services staff or the User Services staff. Less known to most users, however, but not less important, are the staff of the Systems Support Group and the Administrative group. Each of these groups has a specific purpose, as outlined in the following paragraphs.

Systems Support Group

The Systems Support group, supervised by Rein Mikkor, includes the console operators who monitor and maintain system action from the master console of the S/370-165 located in Room 111, Sandford Fleming Labs. The UTCC Job Form submitted by a user is handled by the console operator. This operator is responsible for the release of Class C jobs for execution as well as issuing CRJE Broadcast messages and SEND messages. He must reply to queries from the system and from programs. Cancellation of a job for any reason, except too many lines of output or too many cards, is usually the action of the console operator. When the system is running smoothly, both the console operator and the systems programmers within the System Support group are doing their job well. The systems programmers evaluate, develop, test, install and maintain all components of the system. These components include OS, HASP, CRJE, remote terminal support and the monitoring tools for users such as the Backlog Display in the local I/O Room. Others measure the use of various components of the system to effectively use these components and to determine the need for more.

The Administrative Group

The administrative group, under the supervision of Al Jones, orders new equipment and makes sure that it is delivered and installed on time. Equipment, includes everything from computer hardware to furniture and building renovations. Users and staff want and need the best, so Al and his group are always under some pressure to "get this, get that". Budgetary reality stares this group in the eyeball every day!

Input/Output Services

The Input/Output Services group, supervised by Derry Cox, are the people who handle all tape and disk mounts. They catalogue tapes and disks and provide the paper and cards required by jobs. The operation of the CALCOMP offline plotter, the High Speed Job Stream terminals and remote online terminals is maintained by this group as well as all contract keypunching and special job handling.

User Services Group

S/370 User Services group, under Stan Yagi, includes the advisors for both the High Speed and the General Purpose Job Streams. The group is responsible for technical documentation, USERBOOK, HOTNEWS, etc., for utilities, applications and contract-programmed software.

All of these groups exist solely to serve the needs of the System/370 user. Management of all the groups mentioned is the responsibility of Dave McNaughton. Users are encouraged to contact Dave or the supervisor of the group concerned with questions or problems. Or, a user with a technical problem may arrange an appointment with senior personnel through a User Services advisor. However, all supervisory personnel telephone numbers are listed in each newsletter.

We want to hear from our users!!!

WORK LOAD ON THE S/370-165

C. A. Ford

The System/370-165 computer continues to absorb growing demands for its general purpose and high speed services. Histograms illustrate vividly the growth since the beginnings of S/360-65 service at the Centre in mid-1968.

In general purpose OS work, the October level of 42,526 jobs has been exceeded only by the peak of March 1972, when 48,358 jobs were handled. (Figure I)

The high speed stream (Figure II) shows the impact of the earlier scheduling of course work. The October 1972 volume, 134,886 jobs, rivals the all-time peak of 154,871 jobs in November of 1971.

The October S/370 work load of HSJS and GPJS combined was 177,412. This is a record volume, exceeding by 10% that of March 1972.

S/3X0 GPJS JOB VOLUME

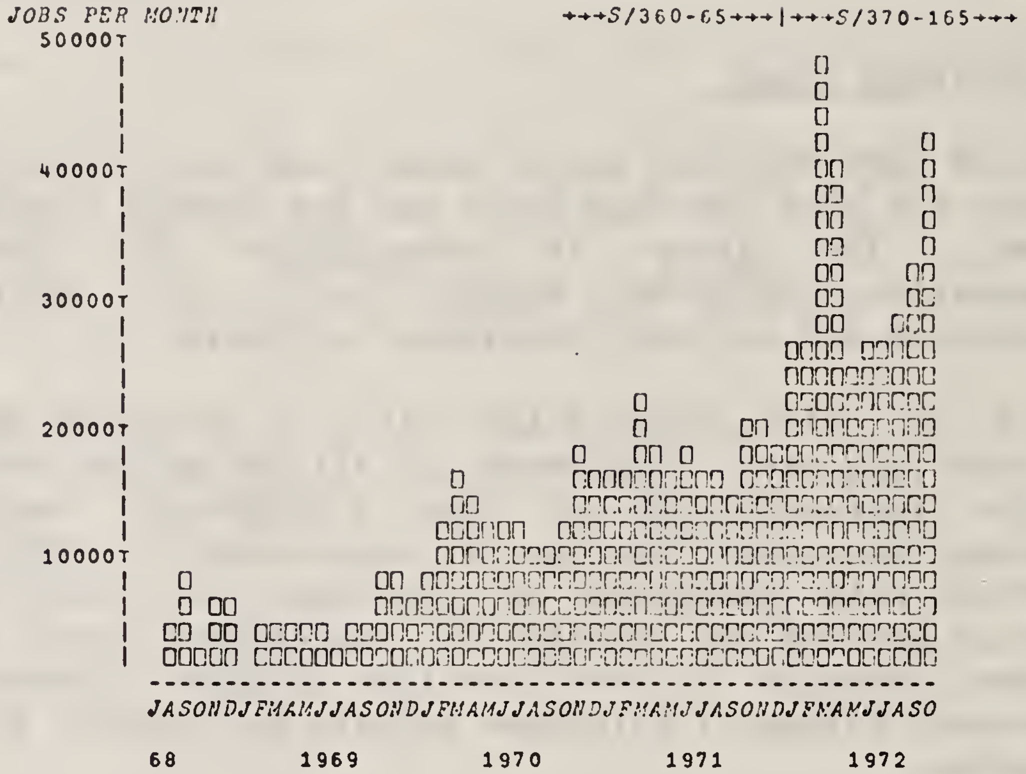


FIGURE I

S/3X0 HSJS VOLUME

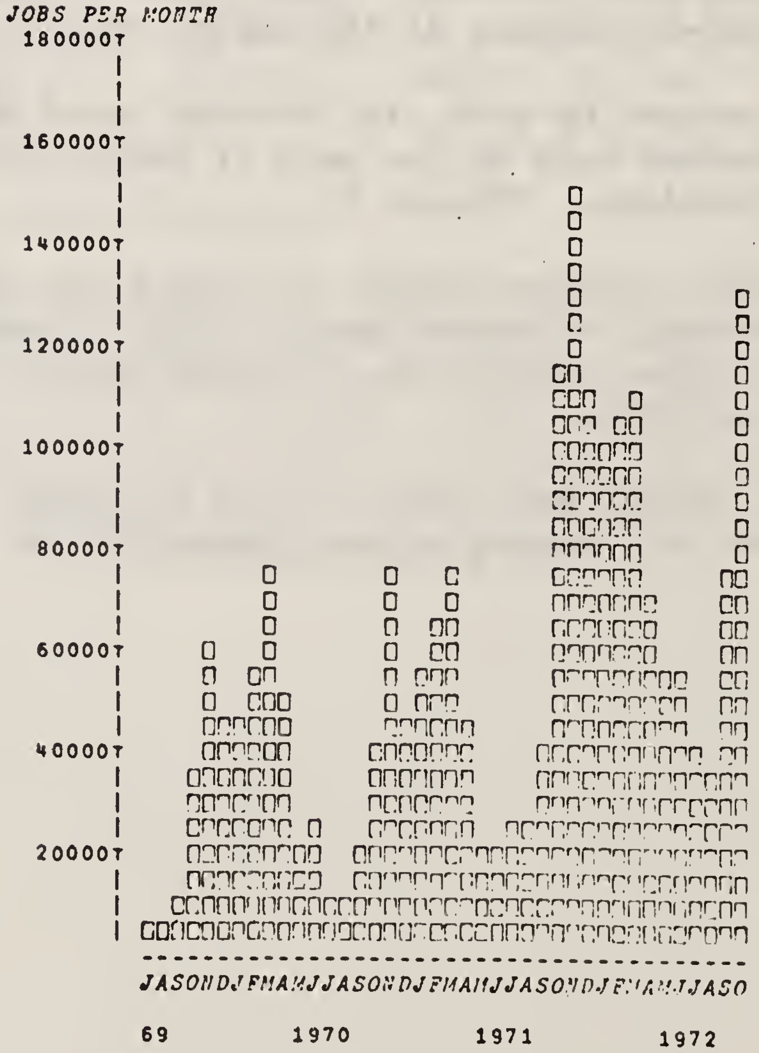


FIGURE II

USERBOOK: S/370 SECTION

J. Campbell

System/370 users should be aware that Section 3 of the new USERBOOK is now the official information document of System/370 Services. It contains information previously documented in the old User's Reference Manual and System Status Bulletins. A brief outline of Section 3 follows:

Chapter 3.1	System/370 Services: Introduction and Hardware
Chapter 3.2	Operations and User Services-Information, Policies and Procedures.
Chapter 3.3	Introduction to System Software
Chapter 3.4	Utilities
Chapter 3.5	Language Processors
Chapter 3.6	High Speed Job Stream at UTCC
Chapter 3.7	Application Software
Chapter 3.8	Conversational Remote Job Entry
Chapter 3.9	System/370 User's Notations and Appendices

All System/370 users are encouraged to purchase a personal copy of USERBOOK Section 3 and to make use of the updating service.

HSJS STATISTICS FOR OCTOBER

J. Lees

During October 134,886 jobs were processed through the High Speed Job Stream. This is an increase of 79% over September. The peak is expected to be reached in November.

The types of jobs are:

WATFIV(W), ALGOL W(G), PL/C(C)
ASMG(A), SIMON(S), LIST & SPITBOL(L)

WATFIV and PL/C had similar usage, contributing 46.0% and 44.8% respectively over the whole month.

Again, over 75% of the jobs processed were completed before 5 o'clock. EUT handled 51.5% of the jobs, 37.5% were processed at ASUT and the remaining 11% originated at remote terminals.

```
ALL    JOB SUMMARY  ************  FOR 01-311072
    W      G      C      P      A      S      L     TOT TIME
   56      6    106      0      1      0      5     174  8+WCC
  279     38    284      0      2      0     13     616   |WWWWWCCCCC
  491     66    523      2     10      0     30    1122   |WWWWWWWWWGCCCCCCCCCC
  732     83    834     14     23      0     24    1710   |WWWWWWWWWWWWWWGCCCCCCCCCCCCCCCC
  643    106    763     12     41      0     39    1604  9+WWWWWWWWWWWWGGCCCCCCCCCCCCCCC
  639     65    919     13     28     11     49    1724   |WWWWWWWWWWWWGCCCCCCCCCCCCCCCCCC
  740     83   1044     69     23      0     43    2002   |WWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCCCCP
  827     73   1149     87     34      2     46    2218   |WWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCCCCCCP
 1014     69    841     10     48      0     51    2033 10+WWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCL
 1087     85    673      2     61      0     40    1948   |WWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCA
 1166     79    734      5     69      0     44    2097   |WWWWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCA
 1370    100    809     12     66      0     60    2417   |WWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCAL
 1337    130   1002     15     70      1     71    2626 11+WWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCAL
 1251    156   1164     31    105      4     67    2778   |WWWWWWWWWWWWWWWWWWWWWWWWWGGGCCCCCCCCCCCCCCCCCCCCCCCAAL
 1399    152   1333     53     97      2    101    3137   |WWWWWWWWWWWWWWWWWWWWWWWWWWWGGGCCCCCCCCCCCCCCCCCCCCCCCCCCPALL
 1382    140   1354     25     91      4     62    3058   |WWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1338    133   1421     38     59      2     68    3059 12+WWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1367    100   1425     19     57      3     67    3038   |WWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1487    125   1518     15     59      2     76    3282   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1558    112   1494     28     70      1     72    3335   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1600    119   1518     19     60      0     58    3374 13+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1482     93   1307     22     70      1     67    3042   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1679    133   1480     24     61      0     80    3457   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1666    134   1466     40     65      0     58    3429   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1464    135   1369     27     66      1     46    3108 14+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCA
 1441    131   1281     19     58      1     56    2987   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1616    136   1411     26     73      1     73    3336   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1691    130   1533     24     80      8     68    3534   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1735    144   1482     27     65      6     56    3515 15+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1693    146   1557     18     93      3     86    3596   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1713    144   1592     13     87      9     90    3648   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1747    155   1578     40    101      5     66    3692   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAA
 1668    142   1526     33     59      9     75    3512 16+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1607    156   1562     28     89      3     89    3534   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1501    119   1375     34     85      1     50    3165   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCAL
 1564    147   1428     50     73      3     62    3327   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCCCCCCCPAL
 1189    103   1176     31     35      0     44    2578 17+WWWWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCCC
 1109     86   1008     19     31      0     44    2297   |WWWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCCCC
 1068    101   1080     22     57      3     30    2361   |WWWWWWWWWWWWWWWWWWWWWGGCCCCCCCCCCCCCCCCCCCCCA
  972     71    933     21     32      3     26    2058   |WWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCC
  893     83    936     20     37      1     28    1998 18+WWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCC
  797     61    970      8     24      3     48    1911   |WWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCCC
  673     53    877     14     30      4     27    1678   |WWWWWWWWWWWWWGCCCCCCCCCCCCCCCCC
  704     58    914     22     31      0     28    1757   |WWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCC
  667     52    876     15     29      1     25    1665 19+WWWWWWWWWWWWWGCCCCCCCCCCCCCCCCC
  647     53    783      7     41      4     23    1558   |WWWWWWWWWWWWGCCCCCCCCCCCCCCC
  621     51    758     10     46      0     30    1516   |WWWWWWWWWWWWGCCCCCCCCCCCCCCC
  702     54    854     12     37      1     20    1680   |WWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCC
  776     66    774      1     33      1     24    1675 20+WWWWWWWWWWWWWWWGCCCCCCCCCCCCCCC
  763     68    847      1     39      0     18    1736   |WWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCC
  735     57    778      5     41      0     23    1639   |WWWWWWWWWWWWWWGCCCCCCCCCCCCCCC
  819     68    805     10     32      1     15    1750   |WWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCC
  737     61    887      8     40      0     25    1758 21+WWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCC
  775     78    744     13     46      2     26    1684   |WWWWWWWWWWWWWWWGCCCCCCCCCCCCCC
  724     81    823      5     48      1     15    1697   |WWWWWWWWWWWWWWGCCCCCCCCCCCCCCCC
  663     66    713      7     27      0     33    1509   |WWWWWWWWWWWWWGCCCCCCCCCCCCCC
----- ------ ------ ------ ------ ------ ------ ------- 22+---------+---------+---------+---------+---------+---------+---------+
62079   5437  60451   1145   2937    109   2660  134817   0        500      1000      1500      2000      2500      3000      3500
```

DOWNTIME FOR OCTOBER

J. Lees

The three charts following indicate the downtime and RE-IPL's for CRJE, High Speed Job Stream and the main System/370.

On October 12, 284 minutes of downtime resulted from a combination of hardware and software difficulties. Unscheduled software maintenance accounted for a total of 155 minutes, while console lockouts and a recurring channel error accounted for the remainder.

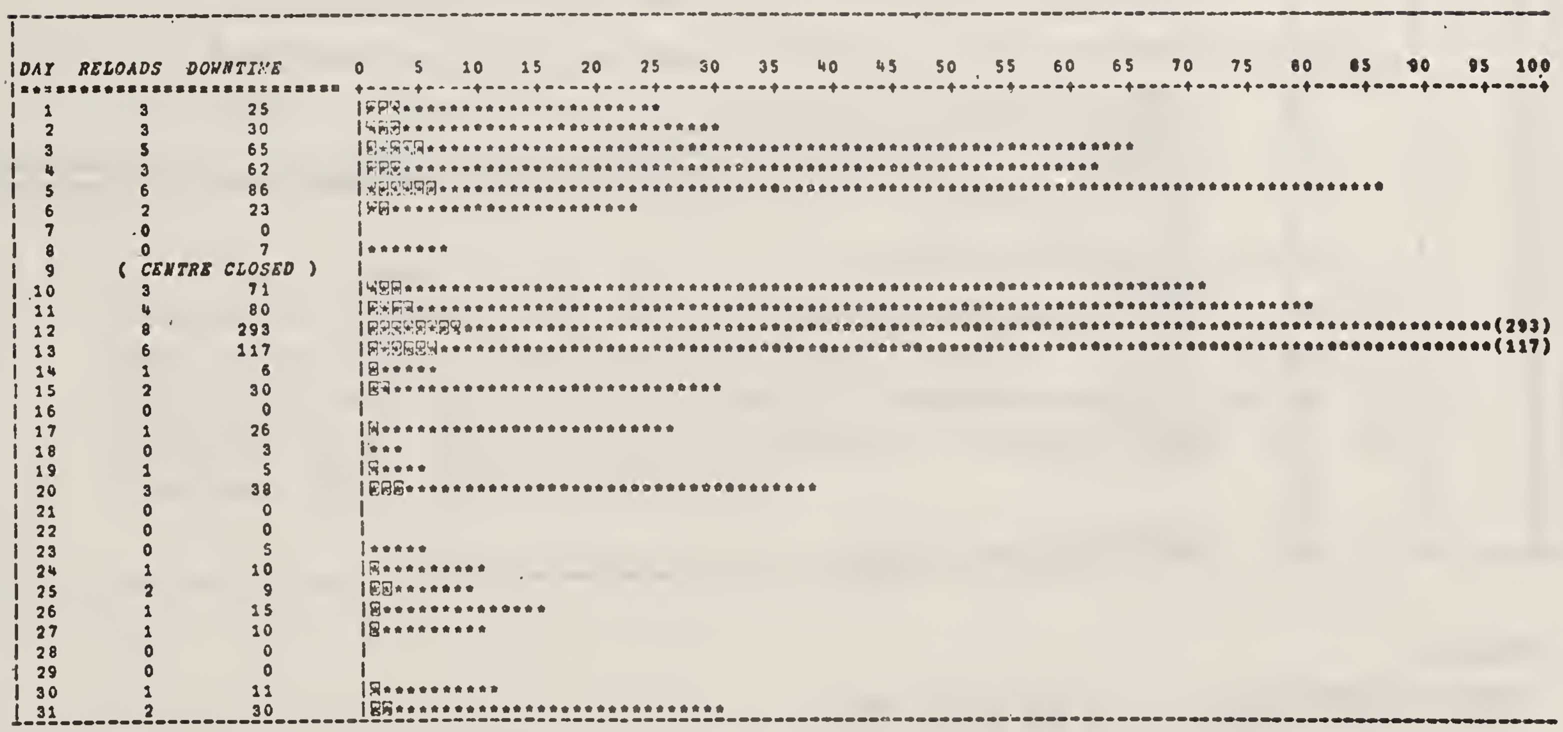
An extended system test of 50 minutes and a channel error caused 107 minutes of downtime on October 13.

Most of the system problems were solved by October 14. After this date the system had an average of 1.17 RE-IPL's per day and an average daily downtime of only 7.76 minutes.

Hammer trouble at the ASUT printer caused 210 minutes of downtime reflected on the HSJS graph for October 21. An additional 135 minutes of downtime was caused by the same problem on October 22.

The HSJS does not run on the same scheduled hours as S/370. Consequently, downtime incurred on the S/370 need not affect the HSJS. This is shown on October 12, when S/370 was down for 175 minutes outside of HSJS scheduled hours.

DOWNTIME REPORT ON CRJE FOR OCT '72



```
DAY  RELOADS  DOWNTIME
  1     3        25
  2     3        30
  3     5        65
  4     3        62
  5     6        86
  6     2        23
  7     .0        0
  8     0         7
  9   ( CENTRE CLOSED )
 10     3        71
 11     4        80
 12     8       293
 13     6       117
 14     1         6
 15     2        30
 16     0         0
 17     1        26
 18     0         3
 19     1         5
 20     3        38
 21     0         0
 22     0         0
 23     0         5
 24     1        10
 25     2         9
 26     1        15
 27     1        10
 28     0         0
 29     0         0
 30     1        11
 31     2        30
```

```
STATISTICS:

    TOTAL TIME DOWN (MIN) .....  1057 AVG. PER DAY  35.2
    TOTAL NUMBER OF RELOADS ...    59 AVG. PER DAY   2.0
```

DOWNTIMES (IN MINUTES) ARE SHOWN AS ASTERISKS E.G. ************

RELOADS REFERS TO THE NUMBER OF TIMES THE HIGH-SPEED-JOB-STREAM MONITOR HAD TO BE RE-STARTED AND ARE SHOWN AS RECTANGLES E.G. ▯▯▯▯

```
                                     DOWNTIME REPORT ON RSJS FOR OCT '72

-----------------------------------------------------------------------------------------------------------------------------------
|
|DAY  RELOADS  DOWNTIME     0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100
|========================== +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|  1        3         25    |□□□**********************
|  2        3         30    |□□□***************************
|  3        5         65    |□□□□□************************************************************
|  4        3         62    |□□□***********************************************************
|  5        6         71    |□□□□□□*****************************************************************
|  6        4         97    |□□□□*********************************************************************************************
|  7        0          0    |
|  8        1          7    |□******
|  9    ( CENTRE CLOSED )   |
| 10        3         62    |□□□***********************************************************
| 11        4         42    |□□□□**************************************
| 12        6        119    |□□□□□□*****************************************************************************************(119)
| 13        6        107    |□□□□□□*****************************************************************************************(107)
| 14        1          6    |□*****
| 15        2         20    |□□******************
| 16        0          0    |
| 17        1         13    |□************
| 18        0          5    |*****
| 19        0          0    |
| 20        3         25    |□□□**********************
| 21        0        210    |***********************************************************************************************(210)
| 22        0        135    |***********************************************************************************************(135)
| 23        0         70    |**********************************************************************
| 24        1         10    |□*********
| 25        0          0    |
| 26        0          0    |
| 27        1         10    |□*********
| 28        0          0    |
| 29        0          0    |
| 30        1         11    |□**********
| 31        2         20    |□□******************
-----------------------------------------------------------------------------------------------------------------------------------

STATISTICS:

     TOTAL TIME DOWN (MIN) .....  1222 AVG. PER DAY  40.7
     TOTAL NUMBER OF RELOADS ...    56 AVG. PER DAY   1.9
```

```
                                     DOWNTIME REPORT ON SYSTEM370 FOR OCT '72

-----------------------------------------------------------------------------------------------------------------------------------
|
|DAY  RELOADS  DOWNTIME     0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100
|========================== +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|  1        3          5    |□□□**
|  2        3         30    |□□□***************************
|  3        5         65    |□□□□□************************************************************
|  4        3         62    |□□□***********************************************************
|  5        6         74    |□□□□□□********************************************************************
|  6        2         11    |□□*********
|  7        0          0    |
|  8        1          7    |□******
|  9    ( CENTRE CLOSED )   |
| 10        3         60    |□□□*********************************************************
| 11        4         42    |□□□□**************************************
| 12        8        284    |□□□□□□□□***************************************************************************************(284)
| 13        6        107    |□□□□□□*****************************************************************************************(107)
| 14        1          6    |□*****
| 15        2         20    |□□******************
| 16        0          0    |
| 17        1         12    |□***********
| 18        1          5    |□****
| 19        1          5    |□****
| 20        4         30    |□□□□**************************
| 21        0          0    |
| 22        0          0    |
| 23        0          5    |*****
| 24        3         22    |□□□*******************
| 25        2          7    |□□*****
| 26        1          5    |□****
| 27        1         10    |□*********
| 28        0          0    |
| 29        0          0    |
| 30        1         11    |□**********
| 31        3         25    |□□□**********************
-----------------------------------------------------------------------------------------------------------------------------------

STATISTICS:

     TOTAL TIME DOWN (MIN) .....   910 AVG. PER DAY  30.3
     TOTAL NUMBER OF RELOADS ...    65 AVG. PER DAY   2.2


                                     DOWNTIMES ( IN MINUTES ) ARE SHOWN AS ASTERISKS E.G. *************

                                     RELOADS REFERS TO THE NUMBER OF RE-IPL'S REQUIRED DUE TO SYSTEM
                                     FAILURES AND ARE SHOWN AS RECTANGLES E.G. □□□□
```

S/370 CREDIT REQUESTS

C. A. Ford

Credit request activity for September and October amounted to one hundred and eight claims, almost evenly split between the two months. Twenty percent were precipitated by hardware malfunctions of transient nature. Another fifty-five percent were associated with software difficulties. The balance, twenty-seven percent, were of human origin.

Is it legitimate to list any "computer failure" as other than human error? Our maxim, stoutly held, is that you can't blame the machine for computational errors. This doesn't mean that machine malfunctions can't occur. The Computer Centre management makes restitution for hardware (hidden maintenance error?) or software (bad coding or design by someone) or direct human errors in recognition of the essence of the issue that people are responsible for what the machines do for them.

HIGH SPEED JOB STREAM NEWS

M. Tapia

Advisor Hours at ASUT

The Arts and Science Undergraduate Terminal advisor hours were extended November 11 to include Saturdays. The schedule for advising at ASUT is now:

10:00-18:00	Monday-Friday
10:00-17:00	Saturday

Engineering Undergraduate Terminal advisor hours remain the same:

10:00-18:00	Monday-Friday

This change was made to accommodate the requests of extension students who were unable to see an advisor during the normal hours from Monday through Friday. This change is temporary and will be continued only if the demand is sufficiently high. (The ASUT/EUT advisors see on the average 18-19 people per hour).

WATBOL Is Coming

WATBOL, the University of Waterloo high speed COBOL compiler, is scheduled to be placed on the High Speed Job Stream by January 2, 1973. Documentation is being prepared and will be released when WATBOL is put on the system. The jobcards have already been designed and ordered.

WATLIB

WATLIB is a large collection of WATFIV subroutines for doing a wide variety of tasks, and can be accessed through WATFIV. The source for the routines used in the program can be printed if LIBLIST has been specified on the job card. The library consists of over 20,000 card images (with most routines in packed format) and has over 750 routines (both members and aliases or entries).

To keep the user aware of the features of this package, the user can obtain an index of the routines, a list of bugs, and a list of new routines by coding LIBLIST on the WATFIV $JOB card and by calling one or more of the following subroutines:

NEWLIB	for new members
LIBBUG	for bugs in the library routines
LIBIND	for an index of the WATLIB
WATLIB	for the above three subroutines in the order listed above.

These subroutines consist of comments and will be updated regularly to reflect changes in WATLIB.

PL/C Use Surpasses WATFIV

For the short period of October 2, 1972 through November 11, 1972, the use of PL/C actually exceeded that of the long-time favorite WATFIV. During this period, 86,188 PL/C jobs were run compared with 85,567 WATFIV jobs. Projection indicates that PL/C jobs will constitute an increasing proportion of the total jobs run and will surpass WATFIV usage as the year progresses.

FORTRAN COMPILER SURVEY

J. Wettlaufer

Presently there are five FORTRAN compilers on the IBM S/370-165. Each of these compilers is designed for a particular purpose, and depending upon what they are doing, the costs involved in compiling and executing programs can vary by a large amount. If a user is not careful to select the right compilers for his job, a great amount of computer time is wasted.

WATFIV is a very fast compiler intended for initial program debugging or for small programs with short executions. It has extensive error checking at compile and run times. This results in very fast compile times but long executions. The time taken to execute a program compiled by WATFIV may be many times greater than that required by a normal FORTRAN compiler.

FORTRAN-G and the new IBM program product FORTRAN-G1 are fast compilers which generate object code. FORTRAN-G1 has a number of extensions such as "list directed I/O". The error checking involved is not as extensive as that done by WATFIV, but is still fairly good. Since FORTRAN-G and G1 generate code which is executed, the run times for the compiled program will be much faster than that for WATFIV. These compilers should be used for medium length jobs which would normally be too expensive to run on WATFIV.

FORTRAN-H and another IBM program product FORTRAN-H-EXTENDED are larger code optimizing compilers which generate code that is extremely fast when executed. FORTRAN-H-EXTENDED has a "quadruple precision" feature presently not available on any other IBM FORTRAN compiler. In addition, FORTRAN-H and EXTENDED have features available which are not available in WATFIV, FORTRAN-G or in FORTRAN-G1. These compilers should not be used for debugging purposes, but only for a final compilation before a long execution. Both of these compilers have parameters which can be set at execution time. They specify the degree of code optimization that will be performed (i.e.: OPT=0 is specified for minimal optimization and OPT=2 for maximum code optimization). This may result in large savings at execution time (in some cases 1/2 the cost of FORTRAN-G).

The Computer Centre has conducted a survey which measured the speeds of the various compilers for compiling a large FORTRAN source deck. In this survey approximately 5300 source statements were put in a dataset and then used as the input source text for the compilers. This dataset consisted of about 25 separate modules varying in size from 10 to 500 source statements.

The resulting figures speak for themselves in indicating the various compilation speeds and the associated costs. All of these figures were taken from the step termination messages.

The figures for WATFIV could not be calculated exactly since the dataset contained several separate FORTRAN jobs. However, one would expect that the compilation cost for WATFIV would be less than that of FORTRAN-G.

FORTRAN COMPILER COST SURVEY

COMPILER	I/O WAIT TIME (min)	CPU TIME (min)	EQUIVALENT RUN TIME (min)	CORE USAGE (KB-min)	COST (Priority 6)
G	.06 min.	.43 min.	.49 min.	137.20 KB-min.	$ 4.99
G1	.08 min.	.44 min.	.52 min.	145.66 KB-min.	5.28
H(OPT=0)	3.91 min.	.36 min.	4.27 min.	1195.60 KB-min.	15.60
H(OPT=1)	5.60 min.	.49 min.	6.09 min.	1705.20 KB-min.	22.07
H(OPT=2)	5.77 min.	.73 min.	6.50 min.	1820.00 KB-min.	25.31
EXTENDED (OPTIMIZE (0))	8.64 min.	.40 min.	9.04 min.	2531.10 KB-min.	29.98
EXTENDED (OPTIMIZE (1))	8.07 min.	.38 min.	8.44 min.	2363.20 KB-min.	28.04
EXTENDED (OPTIMIZE (2))	11.00 min.	.71 min.	11.71 min.	3276.00 KB-min.	40.44

*NOTE: These figures are for compile time only.

SYSTEM STATUS BULLETINS ISSUED

J. Campbell

56:72:1	SPITBOL Symbolic Parameters
56:72:1	ALGOL Procedure Change-LEVEL=W
57:72:1	FORTRAN IV (G1) Compiler
58:72:1	USERBOOK-A New Publication
59:72:1	Features of New Version of HASP

NEW ASSEMBLER LANGUAGE I/O SYSTEM AVAILABLE AT UTCC

H. Kugel

Often a user will code his application in assembly language to obtain the full flexibility of the S/370 machine instruction set and to obtain a core usage saving that is rarely possible with higher language processors.

In this situation, Input/Output can be a problem. Should the user use READ/WRITE to input and output physical blocks of data or should he use GET/PUT to obtain or transmit logical records of data? If he is working with logical records, what type of buffering should he use? Simple buffering? Exchange buffering? And, in all of the above cases, what about all the many Data Control Block Options available? Should the user guess, take defaults, call a friend, or what?

UTCC has currently implemented the NIBSIO subsystem. This package, written by a group of employees in the IBM data processing division and distributed through the SHARE program library, does optimal logical reading and writing for the user automatically. All the assembly language programmer need do is code a series of CALL statements in his coding. The NIBSIO package does all the rest. The NIBSIO system allows for the reading and writing of any number of sequential, partitioned or index sequential datasets by using the CALL statement. Extensive error checking and error reporting facilities are available in the package. The user need not worry about diagnostic routines of his own. Automatic record count accounting is available for all datasets and includes Records Read, Records Added, Records Deleted, and Records Updated.

The package also protects against program logic errors and allows for diagnostic display of control information if necessary.

The package will be defined in an update to the USERBOOK, but in the meantime any interested user may contact Herb Kugel at 928-7286 to discuss the system and his application.

INTERACTIVE SYSTEMS RELIABILITY

S. Goldfarb

The following table summarizes the time lost out of scheduled hours of production for the period October 1 through October 31, 1972. The total number of scheduled hours of operation during this period was 505.5 (including the October 23 holiday). There was one late start of two minutes for CPS. The table below shows the time lost due to system failures for each of the systems: five unscheduled IPL's were required as a result of the system failures. Superstitions aside, Friday, October 13 did prove to be a disastrous day. The uptime for each of APL, ATS and CPS was 97.5%. In addition to the scheduled hours of operation, APL, ATS and CPS were available during approximately 133, 129 and 127 hours, respectively, of unscheduled weekend time.

DATE	DOWN TIME (mins.)			REASON
	APL	ATS	CPS	
Sun. Oct. 1			1	SD37 Abend (software)
Fri. Oct. 13	21	22	20	*Memorex 1270 Error (hardware)
Fri. Oct. 13	610	610	610	*Memorex 1270 Failure (hardware)
Tues. Oct. 17		5		ATS System Error (software)
Tues. Oct. 17	7	8	10	*System Failure (software)
Thurs. Oct. 19	5	6	7	*Memorex 1270 Error (hardware)
Thurs. Oct. 19	97	98	100	*Memorex 1270 Error (hardware)
Fri. Oct. 27	8			Operator Error
Totals	748	749	748	*IPL required

CAL LESSONS

S. Goldfarb

Several Computer Assisted Learning lessons sponsored by the Erindale Campus (see article on "Computer Assisted Learning At Erindale" in this Newsletter) are available to APL users through the APL Public Library. Below are brief descriptions of the current CAL lessons (in library 326) and also of the CAL drills (in library 426). To access a lesson or drill, *LOAD* the Workspace of interest and begin by typing the name appearing within the square brackets on the corresponding description below. For example, to use the lesson on "Electrical Circuit Theory - Introduction" (Workspace *ELECTRIC*1), type:

```
)LOAD 326 ELECTRIC1
LESSON
```

LIBRARY 326

COMPUTER ASSISTED LEARNING LESSONS AVAILABLE

FROM ERINDALE CAMPUS

STUDENTHOW	*USE OF TERMINAL AND APLCAT LESSONS [STUDENTHOW]*
*CIRCULAR*1	*INTRODUCTORY LESSON IN CIRCULAR MOTION [CIRCULAR*1*]*
*CIRCULAR*2	*LESSON TWO IN CIRCULAR MOTION [CIRCULAR*2*]*
MICHELSON	*MICHELSON-MORLEY SPECIAL RELATIVITY EXP.-PART*1 *[MICHELSON]*
MORLEY	*MICHELSON-MORLEY SPECIAL RELATIVITY EXP.-PART*2 *[MORLEY]*
LORENTZ	*LORENTZ-FITZGERALD CONTRACTION THEORY [LORENTZ]*
EANDM	*ELECTRICITY AND MAGNETISM [EANDM]*
WORKA	*LESSON IN 'WORK' IN PHYSICS [WORK]*
MOTION	*LESSON IN MOTION [MOTION]*
UNITS	*UNITS OF MEASUREMENT IN PHYSICS [UNITS]*
RELATIVEXPT	*WORKSPACE SIMULATING A LINEAR ACCELERATOR [RELATIVEXPT]*
*ELECTRIC*1	*ELECTRICAL CIRCUIT THEORY - INTRODUCTION [LESSON]*
*ELECTRIC*2	*ELECTRICAL CIRCUIT THEORY - PASSIVE NETWORKS [LESSON]*
WFFNPROOF	*INTRODUCTION TO SYMBOLIC LOGIC USING WFF'S [DESCRIBE]*
SHAKEAWFF	*SYMBOLIC LOGIC USING WFF'S (WELL FORMED FORMULAE([DESCRIBE]*
GAMES	*GAMES USING SYMBOLIC LOGIC [GAME*1*] AND [GAME*2*]*
*CALCULUS*1	*FUNDAMENTALS OF CALCULUS - LESSON ONE [CALCULUS*1*]*
*CALCULUS*2	*FUNDAMENTALS OF CALCULUS - LESSON TWO [CALCULUS*2*]*
*CALCULUS*3	*FUNDAMENTALS OF CALCULUS - LESSON THREE [CALCULUS*3*]*

LOGARITHM1	*LESSON IN THE USE OF LOGARITHMS [LOGARITHM1]*
LOGARITHM2	*LESSON TWO IN THE USE OF LOGARITHMS [LOGARITHM2]*
APLCATHOW1	*LESSON IN THE USE OF APLCAT IN LESSON WIRTING [DESCRIBE]*
APLCATHOW2	*LESSON TWO IN THE WIRTING OF APLCAT LESSONS [DESCRIBE]*
APLCATHOW3	*THIRD LESSON IN CAL LESSONS USING APLCAT [DESCRIBE]*
RELATIVITY	*SHORT LESSONS IN THE IMPLICATIONS OF RELATIVITY [DESCRIBE]*

LIBRARY 426

COMPUTER ASSISTED LEARNING DRILLS AVAILABLE

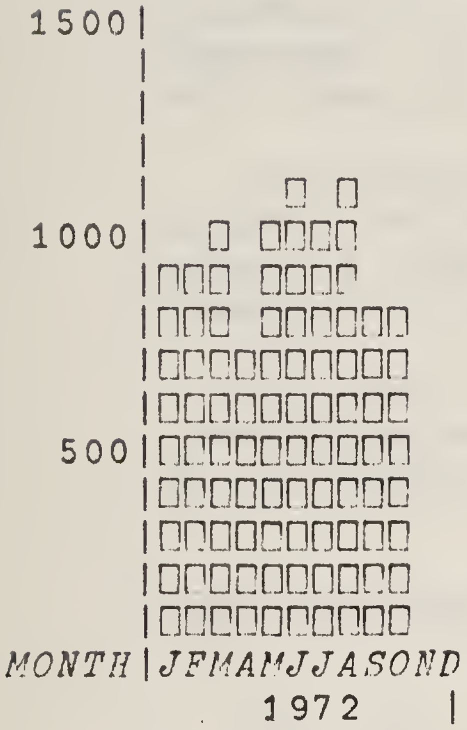
FROM ERINDALE CAMPUS

MATHDRILL	*DRILL IN ELEMENTARY MATHEMATICS [MATHDRILL]*
RATOP	*RATIONAL AND DECIMAL MATRIX OPERATIONS [RATOP] AND [ROWOP]*

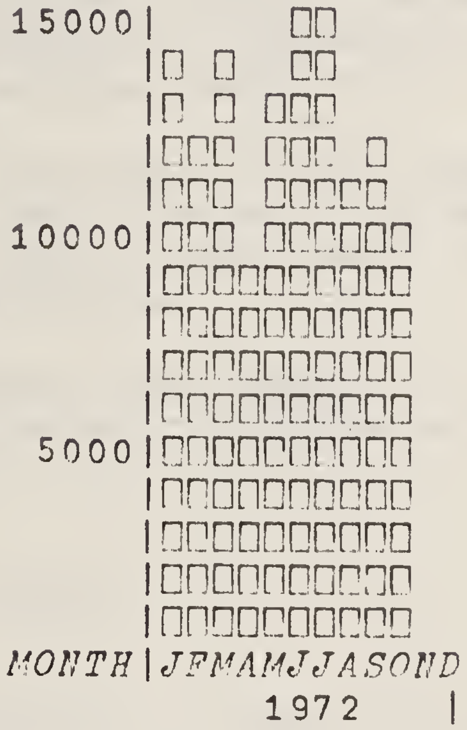
7094 PRODUCTIVITY

J. V. Walton

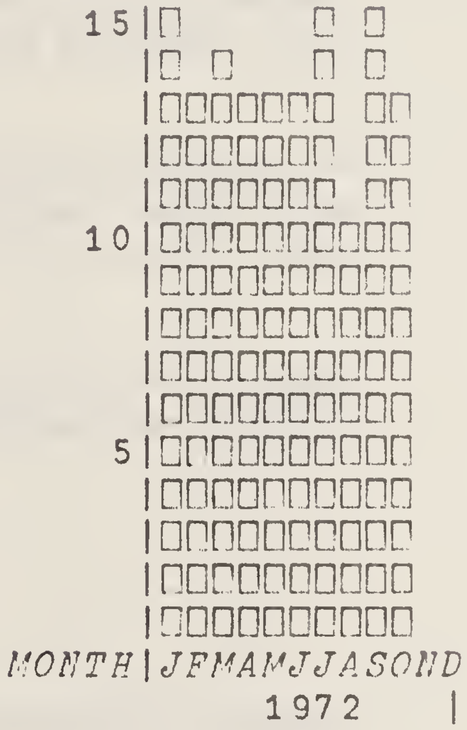
As the charts below show, 7094 usage remains fairly consistent. A high proportion of long jobs keeps the average time per job near 15 minutes.



JOBS PER MONTH



MINUTES PER MONTH



MINUTES PER JOB

SELF SERVICE

Six more Consortium members have been trained to operate the system so that they can do hands-on debugging and extra work on weekends and after midnight.

GENERAL NEWS

J. R. McBride

CRF-UTCC Merger Committee

A committee has been established to investigate the possible merger of the Computer Research Facility and the University of Toronto Computer Centre.

The committee members are Mr. J.R. McBride, (CRF), Chairman, Dr. J.C. Wilson, (UTCC), Professor J.F. Keffer, (Department of Mechanical Engineering) and Professor H.W. Smith, (Dept of Electrical Engineering).

The committee will begin its work shortly and intends to contact users for their opinions. The committee will then prepare a final report and present it to the CRF Policy Committee for consideration.

All users who have some comments or suggestions to make about the proposed merger are invited to contact the members of the committee.

Graphic Packages at CRF

CRF has prepared a summary of graphical packages currently available at CRF on the IBM 2250 video display.

The summary includes descriptions of ARTA (a computer art package), CADOCS (Computer Aided Design of Control Systems), RADGRAPH (for graphical display and manipulation of RADDT data), PCDA (Printed Circuit Design Aid), etc.

Demonstrations of these packages may be seen by contacting K.C. Patnaik, Head of Operations, telephone 8853.

Copies of the summary are available from Miss Joyce King in the CRF office, Room SF 2740, Sandford Fleming Labs. or by telephoning 6326.

Change in Operating Hours

As of Monday, December 4, 1972 the CRF lab. hours will be as follows:

Monday to Friday - 9:00 a.m. to 8:00 p.m.

Saturday, Sunday and holidays - Closed

The lab. will be reserved for grade A operators after 8:00 p.m.

Visitors to the Lab.

The following people visited the CRF lab. between October 13th and November 13th, 1972: Professor Max Goldman (Ecole Superieur d'Electricite Larousse, France), Mr. William Dorko and Mr. Harold McNamara (Eastdale C.V.I. Oshawa), Mr. Bernard Hanson (Toronto), Professor John Phillips (CRC, Ottawa), Mr. Brian Smith (Bell-Northern Research, Ottawa), Mr. Bob Campbell and Mr. John Wright (Bell Canada, Ottawa), Professor Alan Francis (Atlas Computer Lab., Didcot, England) and also a delegation from the People's Republic of China consisting of: Professor Pei Shih-Chang (Head), Professor. Pai Chieh Fu-Chang (Deputy Head) and twelve colleagues.

CHANGES TO RADDT SOFTWARE FOR UTCC

Due to recent changes in UTCC data-set standards some changes in JCL are necessary to run CRF RADDT tapes at UTCC. The new JCL is as follows:

For all routines except OSRADLST

```
//   EXEC   FORTGCLG
//FORT.SYSIN  DD  *

 - FORTRAN program -

/*
//LKED.SYSLIB  DD
//          DD  DSN=USER.CRF.LMODS,DISP=SHR
//GO.dd - any GO STEP JCL
```

For OSRADLST and RPLOT

```
     //  EXEC   RADLIST,VOL=vol-ser
     //GO.SYSIN DD  *

          - control cards -

//*
```

NOTE: This is a new version of OSRADLST; documentation may be obtained from CRF.

```
//  EXEC  RPLOT,VOL=vol-ser
//GO.SYSIN  DD  *


 - control cards -


/*
```

NOTE: This is a new version of RPLOT; documentation may be obtained from CRF.

UTCC DIRECTORY

	ROOM	PHONE 928-
DIRECTOR		
John C. Wilson	SF105	6496
ASSISTANT DIRECTOR		
C. Alan Ford	SF105	2991
USER LIAISON OFFICER		
Bill Greene	SF128	2694
Information Office	SF134	4990 or 4991
ADMINISTRATION MANAGER		
Jerry Palter	SF131	8948
AUTHORIZATION CLERKS		
Nancy Pocock (S/370 + 7094)	SF115A	8702
Yvonne Davis (Interactive)	49 St.Geo	8703
S/370 SERVICES		
MANAGER		
Dave McNaughton	SF136	6281
INPUT/OUTPUT SUPERVISOR		
Derry Cox	SF112	7092
USER SERVICES SUPERVISOR		
Stan Yagi	SF112	7331
PROGRAM ADVISORS	SF103	8599
INTERACTIVE TERMINAL SYSTEMS		
MANAGER		
Sam Goldfarb	49 St.Geo	3787
7094 SERVICES		
MANAGER		
Joyce Walton	BT1207	7094

JOB STATUS QUERIES:

SYSTEM/370	7373
7094	7094
Auxiliary Services	6465

INTERACTIVE TERMINAL SYSTEMS:

System Status	6234
APL	7200
ATS	7100
CPS	6200

CONVERSATIONAL REMOTE JOB ENTRY (CRJE)

2741 7233 7381 7386

TTY 7445

UTCC COMPUTER EQUIPMENT

(a) SYSTEM/370 MODEL 165

- located in SF 106/110/111
- provides General Purpose Job Stream and High Speed Job Stream services
- 2048K bytes of core
- 8 disk drives IBM (2314)
- 4 disk drives IBM (3330)
- 1 drum
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 6 printers
- 4 card readers
- 2 card punches
- 7 remote batch terminals
- 1 paper tape reader

- OS/MVT with HASP and CRJE

(b) SYSTEM/360 MODEL 65

- located in Room 333 McLennan Physical Laboratories
- provides Interactive Systems Service
- 1536K bytes of core
- 16 disk drives (2314)
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 100 typewriter terminals

- OS/MVT with APL, ATS, and CPS

(c) 7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

UTCC AUXILIARY EQUIPMENT

- located in SF 109
- System/360 Model 20 for unit record services
- CALCOMP plotter (11" and 30")
- card sorter
- decollator
- 519 reproducing punch
- UNIVAC 1710 interpreting keypunch

UNIVERSITY OF TORONTO
COMPUTER CENTRE,
TORONTO, CANADA.